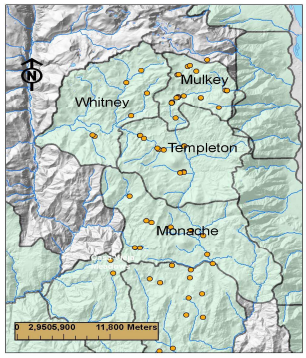
Long Term Condition and Trend Monitoring on the Kern Plateau

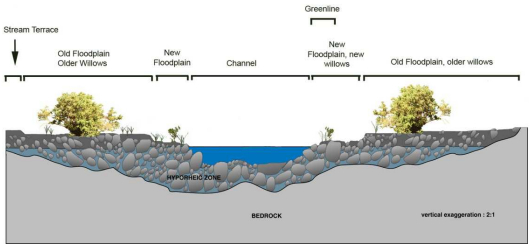
USFS Range Program

Dave Weixelman, range ecologist

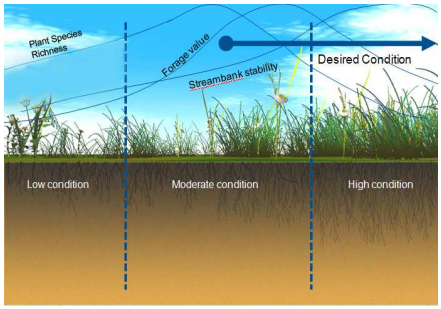
Location of US Forest Service range program long term study plots



Meadow and Streambank (greenline) Condition



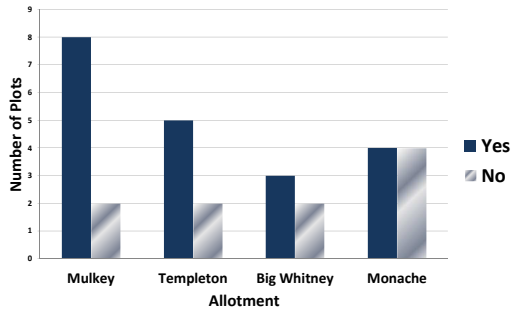
Desired Condition for Meadows



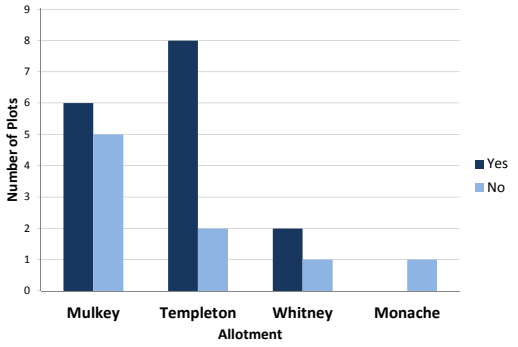
Number of Study Sites in Each Allotment

	Mulkey	Templeton	Whitney	Monache
Meadow Rooted Frequency	8	7	5	7
Greenline	12	10	3	1

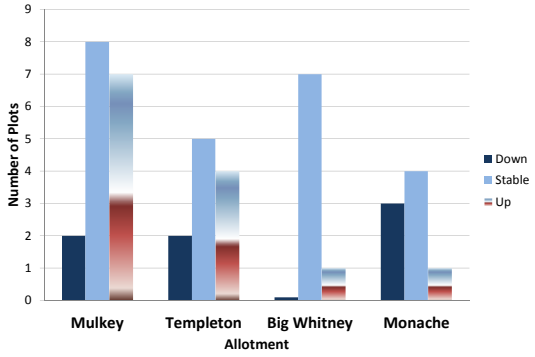
Number of meadow plots by allotment which meet (Yes) or do not meet (No) desired conditions



Number of greenline (streambank) plots by allotment meeting (Yes) or not meeting (No) desired conditions.



Number of plots by trend category by allotment. Data are for both meadow and greenline plots taken together.



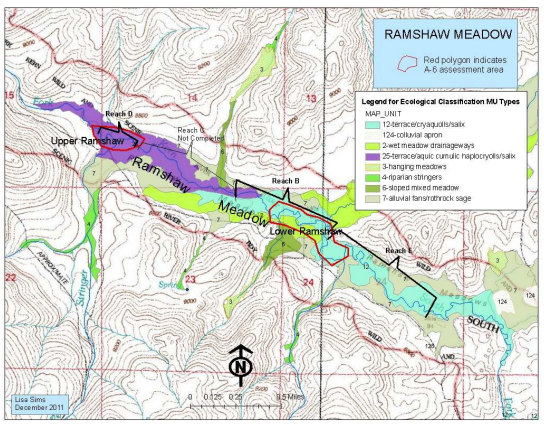
Summary

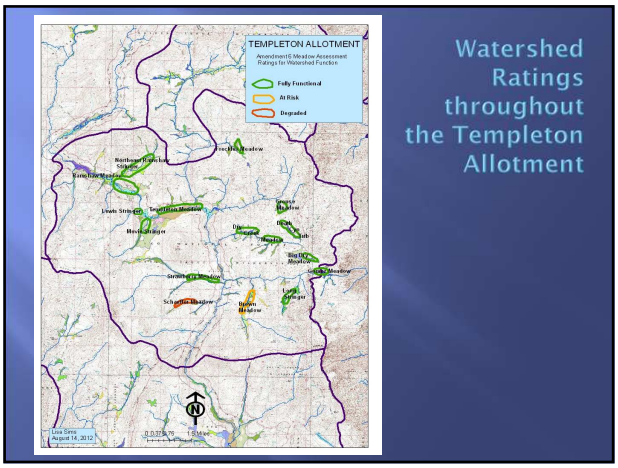
- **Mulkey and Templeton allotments** generally have the **highest** proportion of plots meeting desired condition. In addition, these two allotment generally have the highest proportion of plots trending upward.
- **Whitney and Monache allotments** generally have the **lowest** proportion of sites meeting desired condition. In addition, these two allotments generally have the lowest proportion of sites trending upward.
- Rest from livestock grazing has resulted in a significant improvement in meadow condition and streambank stability on the **Templeton Allotment**. Results of rest on the **Whitney allotment** are mixed; partly because of confounding factors, including previous grazing impacts, and site differences.

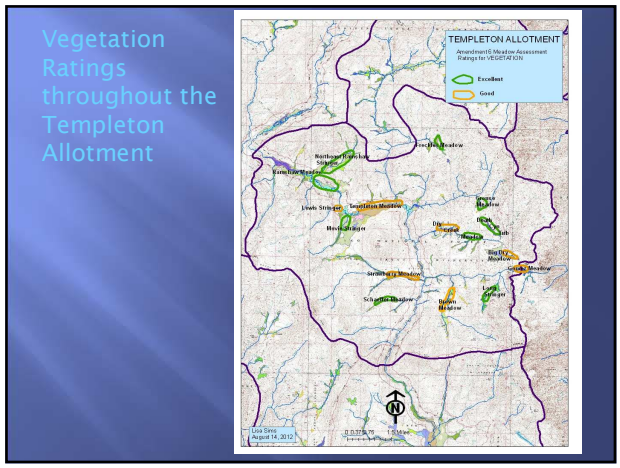
ASSESSMENT RATINGS FOR AMENDMENT 6 AND PFC

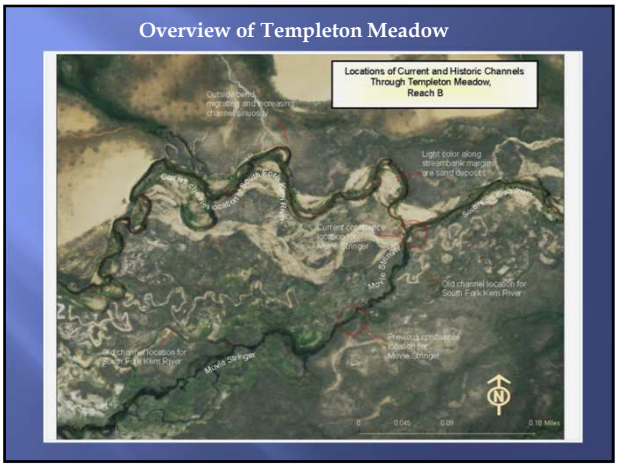
No consistent trend throughout rested or grazed allotments.

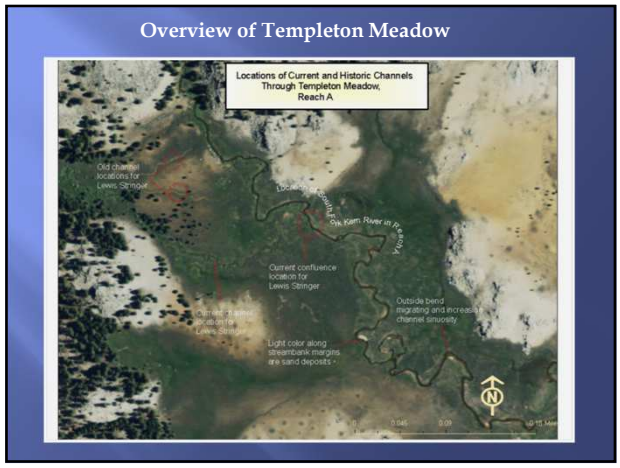
Dynamic processes were very evident throughout the meadows and stream channels.




TEMPLETON ALLOTMENT
Watershed Ratings throughout the Templeton Allotment


Vegetation Ratings throughout the Templeton Allotment
TEMPLETON ALLOTMENT


Overview of Templeton Meadow
Locations of Current and Historic Channels Through Templeton Meadow, Reach B

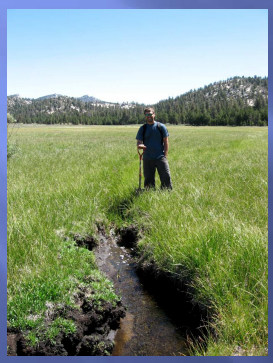

Overview of Templeton Meadow
Locations of Current and Historic Channels Through Templeton Meadow, Reach A

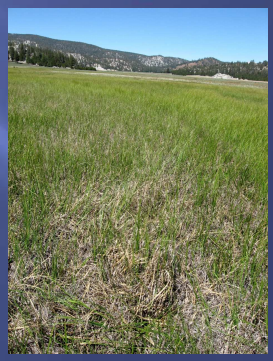

Ramshaw Meadow


Templeton Meadow

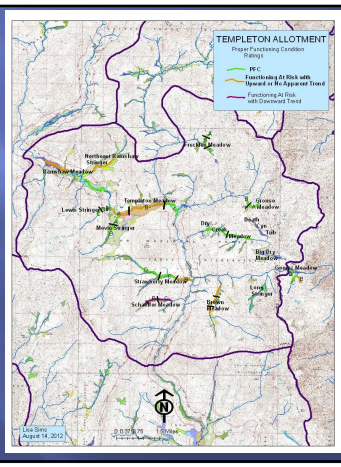
Left: Movie Stringer
Below: Schaeffer Meadow

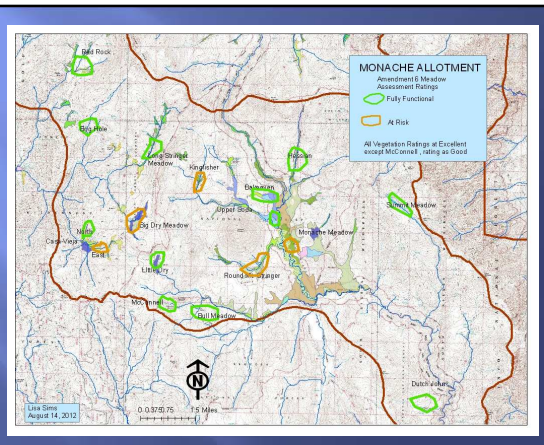
NE Ramshaw Stringer



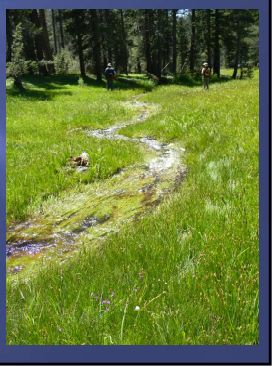


PFC Ratings throughout the Templeton Allotment



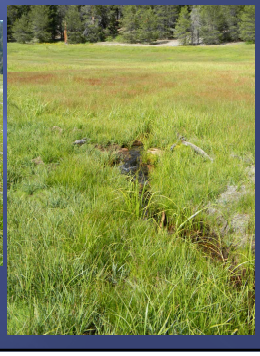


Left: Kingfisher Stringer
Right: Redrock Creek



Casa Vieja

Left: East arm of Meadow
Right: North arm of Meadow



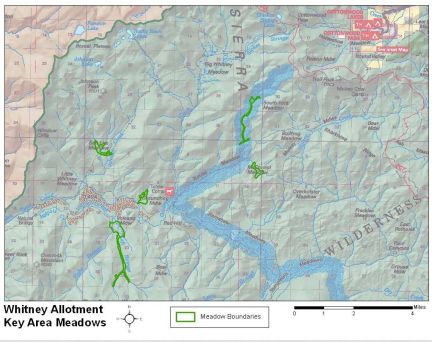
WHITNEY ALLOTMENT MEADOW ASSESSMENT RATINGS

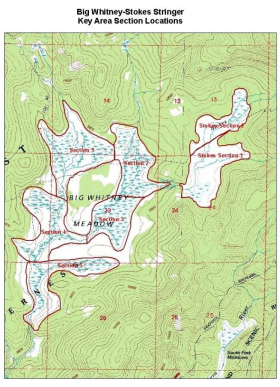
Todd Ellsworth
Watershed Program Manager
Inyo National Forest

MEADOWS EVALUATED

- Salt Lick
- South Fork
- Volcano
- Ground Hog
- McConnel
- Big Whitney (Key Areas 1-5)
- Stokes (Key Areas 1-2)

MEADOWS EVALUATED ON THE WHITNEY ALLOTMENT





MEADOW - SUMMARY

Meadow (Key Area)	A-6 (watershed rating	PFC
South Fork	Degraded	FAR –no trend
Volcano	At Risk	FAR – upward trend
Ground Hog	At Risk	PFC
Salt Lick	Fully Functional	PFC
McConnel	At Risk	PFC
Big Whitney #1	Non-Functional	FAR-No trend
Big Whitney #2	Degraded	PFC
Big Whitney #3	At Risk	FAR – upward trend
Big Whitney #4	Degraded	PFC
Big Whitney #5	Non-Functional	FAR-Upward trend
Stokes #1	Degraded	PFC, FAR-Upward trend
Stokes #2	Degraded	FAR-no trend, PFC

WHITNEY KEY AREA #1

HUMMOCKS AND BARE GROUND

BIG WHITNEY KEY AREA #1

HEADCUT

BIG WHITNEY KEY AREA #2

HEADCUT

BIG WHITNEY KEY AREA #3

HEADCUT

BIG WHITNEY KEY AREA #4

HUMMOCKS – SLOPING SPRING AREA

BIG WHITNEY KEY AREA #2

HUMMOCKS – SLOPING SPRING AREA

BIG WHITNEY KEY AREA #1 PFC ASSESSMENT

FAR – NO APPARENT TREND

BIG WHITNEY PFC KEY AREA #4

PFC

VOLCANO MEADOW

SOIL COMPACTION

VOLCANO MEADOW

ALLUVIAL DEPOSITION

SOUTH FORK MEADOW

BARREN HILLSLOPES

SUMMARY

- Meadows with "sloping spring" areas that were degraded, remain degraded.
- Compaction and bare ground have improved, except for Volcano meadow (volcanic soils).
- Incised stream channels are recovering and creating a new floodplain. (Stokes for instance)

Kern Plateau Grazing Allotments Headcut and Photo-Point Monitoring

Casey C. Shannon
Hydrologic Technician, USDA Forest Service
Inyo National Forest

Headcut and Photo-Point Monitoring Monitoring Focus

- Active Headcut Migration and Gully Formation (Measurable)
- Erosional Feature Photo-Points (Qualitative)
- Treated Headcut and Gully Monitoring (Effectiveness)
- Physical Site Characteristic Data (slope, soil type, vegetation, hydrology, etc).

Headcut and Photo-Point Monitoring Areas

- ***Monache Allotment*** (active)

Redrock and Cold Meadows

- ***Mulkey Allotment*** (active)

Bullfrog, Mulkey, Bear and Overholster Meadows

- ***Templeton Allotment*** (rested)

Strawberry, Upper Strawberry, Brown, Schaeffer, Death Canyon, South Fork Tributary and Fat Cow Meadows

- ***Whitney Allotment*** (rested)

Big Whitney Meadow (Sections 1 through 5), Stokes Stringer (Sections 1-2)

Headcut and Photo-Point Monitoring Objectives

- **Monitor and document hydrologic, riparian and soil conditions** within the Templeton, Whitney, Mulkey and Monache grazing allotments.
- **Establish baseline monitoring sites** with a focus on existing erosional features in key grazing areas in order to monitor and document change over a period of time (7-8 years) in rested and active allotment settings.
- **Observe rates of recovery and ongoing trends** within key areas of the rested allotments (Templeton and Whitney allotments) and to monitor ongoing conditions and trends of active allotments (Mulkey and Monache allotments) to provide a qualitative representation of existing conditions.
- **Monitor past erosion control treatments** in all allotments to determine prescription effectiveness and compare effectiveness with active and rested allotment settings.

Mulkey Allotment – Mulkey Meadow, Cow Camp Stringer

Photo: Headcut 371 (HC-371) Mulkey Meadow on Cow Camp stringer, August 2003. Headcut formed after treatment of original headcut failed and HC resumed migration upstream.

Photo: Re-take of photo HC-371 August, 2011. HC has migrated slowly (0.52 meters) likely due to resistance of a dense, well-developed sod layer. HC face has more soil exposed. HC could be re-treated with new Rx.

Mulkey Allotment – Mulkey Meadow, Cow Camp Stringer

Photo: Headcut 372 (HC-372) Mulkey Meadow August 2003. Steeply faced HC migrating into recovering floodplain of historically incised channel.

Photo: Headcut 372 photo re-taken August 2011. Scour pool has widened below HC and has caused minor bank erosion below HC. HC migration is slow, 0.72 meters. Organic sod layer and dense, well rooted vegetation resists soil erosion. Possible threat of further migration, could be treated.

Mulkey Allotment
Mulkey Meadow Photo Point 357-1A

Photo: Photo-point 357-1A (PP-357-1A), Mulkey Meadows, August 2003. Site is a straight reach of stream (Mulkey Creek) within an older, incised channel and adjacent terraces with recovering floodplain. Channel appears to be over widened.

Photo: PP 357-1A photo taken August 2011. The stream channel is narrowing and stream bank vegetation is more robust, channel is trending closer to normal width to depth ratio. Floodplain vegetation has increased.

Templeton Allotment – Schaeffer Meadow
Photo-Point 342

Photo: Photo-point 342 (PP-342), Schaeffer Meadow, July 2003. An active headcut exists along with eroding stream banks and excess sediment on stream channel in Schaeffer Meadow.

Photo: PP-342 photo re-taken August, 2010. Point bar and stream banks in foreground shows increased vegetation, stability has increased. Gully above scoured and barren and active head cut is migrating upstream. Site has improved, still vulnerable.

Templeton Allotment – Strawberry Meadow
Photo-Point 345-1A

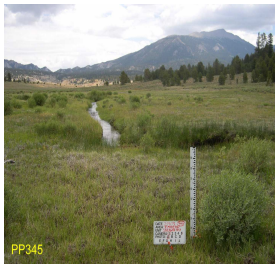


Photo: Photo-point 345 1-A , Strawberry Meadow looking east down creek, July 2003. Willows and other riparian vegetation showing recovery three years after grazing was rested.

Photo: PP-345 1-A photo retaken August 2010. Willow and sedge growth has significantly increased. The stream channel and banks are stable along this reach, a productive site. Floodplain is accessed during average peak flows.

Templeton Allotment – Upper Strawberry Meadow
Treated Head Cut 348

Photo: Treated Head Cut (THC) 348, Upper Strawberry Creek ½ mile below Cow Camp, July 2003. HC was initially treated in 1998 with log headwall and rock chute and treatment held for many years.

Photo: THC 348 Upper Strawberry Creek, August 2010. Structure failed, placed on meander bend, poor prescription. Organic layer shallow here with loose subsoil, high erosion potential. HC migrated upstream 100 feet and active, has formed a gully.

Whitney Allotment – Stokes Stringer Section 1
Headcut 375

Photo: Head cut 375 (HC 375) Stokes Stringer Section 1, September 2003. Tape transect is where top of head cut is located. Thin organic horizon exists at this site (0.01m) and subsoil is alluvial, moderately unconsolidated. Small secondary HC exists 25 feet upstream.

Photo: HC 375 Stokes Stringer Section 1 retake photo September 2010 showing 2003 transect (at meter rod). Head cut has advanced 46 meters since 2003. Existing thin organic layer and deep, underlying loose alluvial soils are conducive to head cut migration and meadow vegetation is less robust.

Whitney Allotment – Big Whitney Meadow Section 2
Headcut 380

Photo: Head cut 380 (HC 380) Big Whitney Meadow Section 2, September 2003. Active head cut in channel, riparian vegetation is thin and bare ground exposed. Also know as photo-point 380 and was first observed in 1999.

Photo: HC 380 Big Whitney Meadow Section 2, photo taken September 2010. Channel filled with deposition from uplands above and re-located stream to a new channel. Widespread organic/silt deposition was found over entire site. Vegetation productivity has significantly increased since 2003.

Whitney Allotment – Big Whitney Meadow Section 1
Photo-Point 382

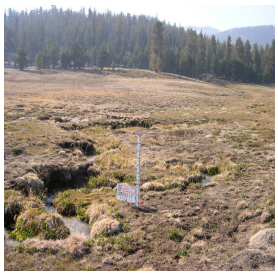


Photo: Photo point 382 (PP 382) Big Whitney Meadow Section 1, September 2003. Hummocks are prevalent over the area, stream banks are mostly degraded and vegetative vigor is low.

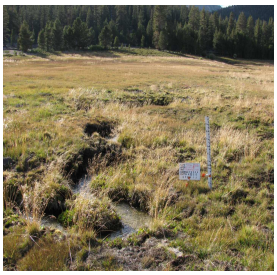


Photo: PP 382 Big Whitney Meadow Section 1 photo retaken September 2010. Hummocks have started to diminish in form but still present. Stream banks are still unstable and degraded but with improved vegetation.

Monache Allotment
Redrocks Meadow Photo Point 313-1B

Photo: Photo-point 313-1B (PP-313-1B) Redrocks Meadow June 2003. Site is a stream bank meander with several nick points. Channel is moderately over-widened as a result of bank erosion.

Photo: PP-313-1B with photo re-taken September 2011. All nick points have mostly filled in with organic soil and new vegetation. Logs are now entrained into stream banks adding to stability and channel has moved towards normal width and depth.

Monache Allotment
Redrocks Meadow Treated Head Cut 312-3A

Photo: Treated Head cut 312-3A (THC-312-3A) Redrock Meadow, June 2003. Head cut treated has slowed head cutting, stream banks have over widened and are showing areas of bare soil.

Photo: THC-312-3A with photo re taken September, 2011. Stream banks have narrowed and stabilized with robust vegetation and erosion rates are low to normal.

Kern Plateau Snow Survey Data
2004-2011

Appendix C – Table 2

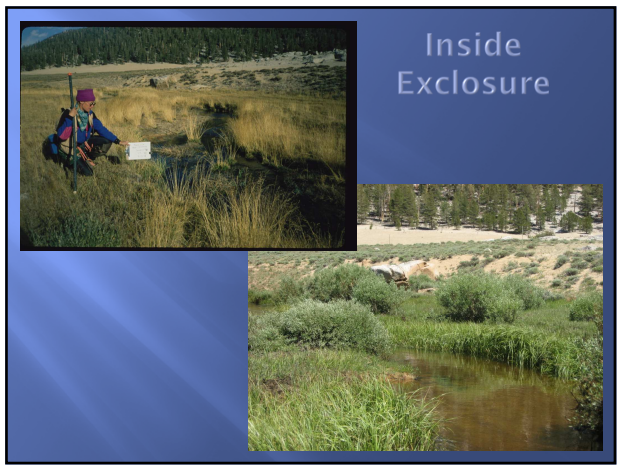
Precipitation Data-Maximum Snow Water Content (SWC) in inches, 2004 -2011
Snow Surveys, State of California - Kern Plateau Sites
(Reference: California Data Exchange Website, Department of Water Resources, 2012)

Data Site	2004	2005	2006	2007	2008	2009	2010	2011	April 1 Average SWC	Years Above Average April 1 SWC (since 2003 - 8 years)
Big Whitney Meadow	16	30	26.5	3	20	13.5	19	30.4	17.2	5
Cottonwood Pass	13	30.5	21.5	7.5	14	9	18.5	28.8	14.8	4
Tunnel Station	13	25.2	21.5	5.5	19	11	18	25.02	15.6	5
Ramshaw Meadow	28.4	26.5	23.5	16.5	17	11	17	22.7	11.5	7
Casa Vieja Meadow	20.5	30	32	10	26	16	28	38.50	19.8	6
Trail Head (east of Templeton Meadow)	13	26.6	15	2.5	16	9	15	21.6	13.2	4

Note: Data is for showing years of above average precipitation at snow survey sites of the Kern Plateau region to compare headcut migration rates. All sites are showing at least 50 % of the water years were above average. SWC maximums are based on April 1 or peak measurement of yearly amounts.

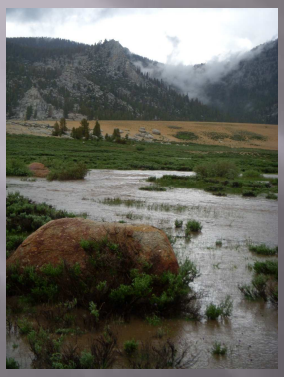
MULKEY CREEK

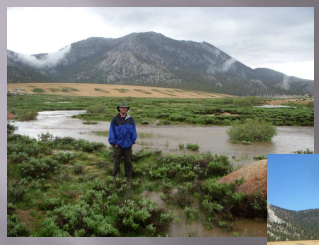
Photo Comparisons from 1994 and 2011

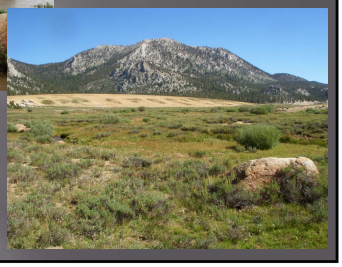

Inside
Exclosure

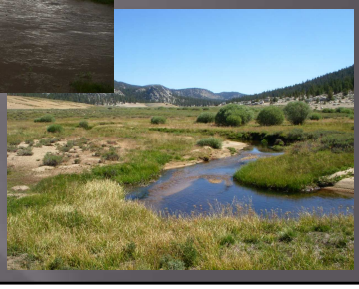
2011 STORM EVENTS

Mulkey Meadow During the
June 6 Rain on Hail Event





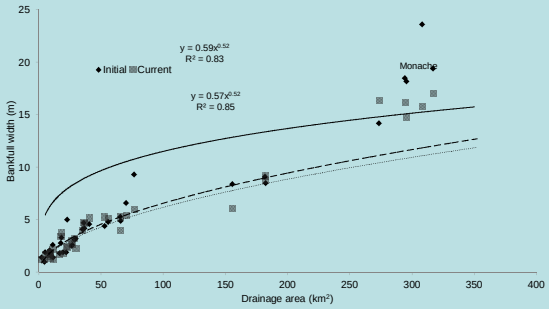




Comparison Photo-Points

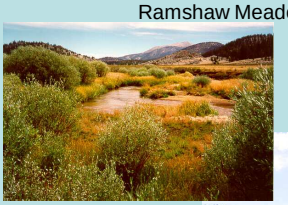
Photographic records of ecological trend on the Kern Plateau with change in grazing management

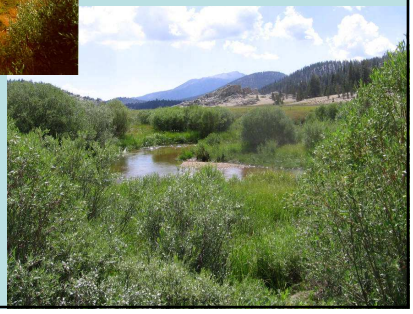
Comparison of Bankfull Width



Ramshaw Meadow, 1988

Ramshaw Meadow, 1997 and 2005





Ramshaw Meadow 1988

Ramshaw Meadow, 1997 and 2005

Inside Templeton Meadow Exclosure, 1988

Inside Templeton Mdw Exclosure, 1997 and 2005

Templeton side-by-side

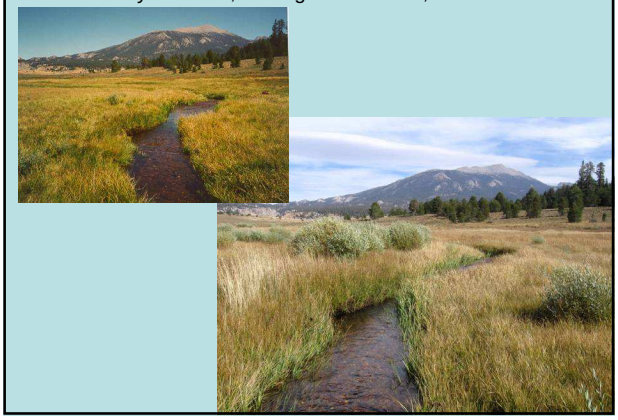
1988 and 2005

Templeton Meadow, Below Exclosure: 1988

Templeton Meadow, below exclosure, 1997 and 2005

Strawberry Meadow, looking downstream, 1988

Strawberry Meadow, looking downstream, 1997 and 2005

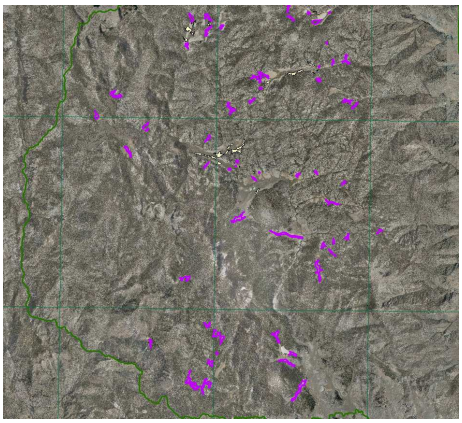


Strawberry Meadow, looking upstream 1988

Strawberry Meadow, looking upstream, 1997 and 2005

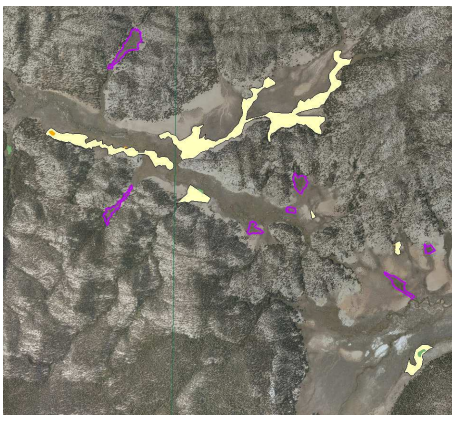
Fens on the Kern Plateau

Kathleen Nelson
Botanist, USFS



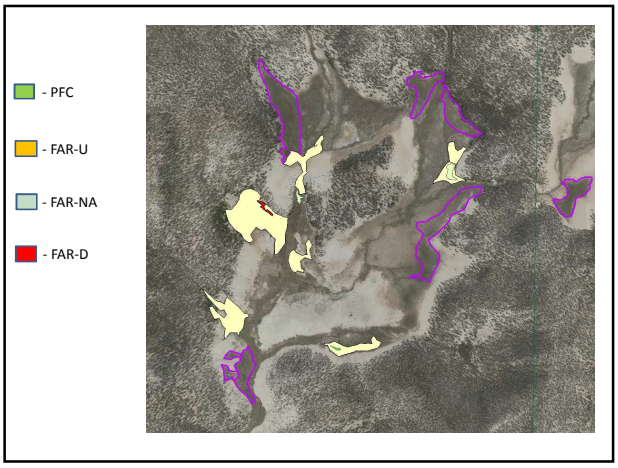
Allotment	Number of Assessed Fens			
	PFC	FAR—U	FAR—D	FAR—NA
Monache	Assessments planned for 2012.	--	--	--
Mulkey	1	1	0	3
Templeton	5	5	0	0
Whitney	1		1	2

- PFC
- FAR-U
- FAR-NA
- FAR-D

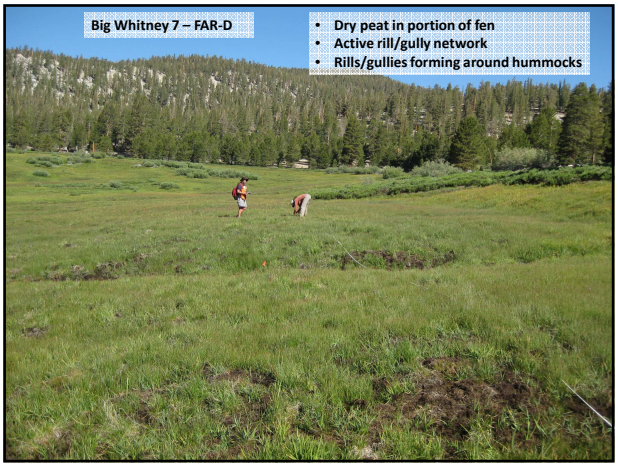



Templeton 4 – FAR-U
Hummocks with non-peat forming vegetation cover between hummocks


Ramshaw 2 spring channel – FAR-U
• Hummocks, bare peat
• Partially vegetated between hummocks

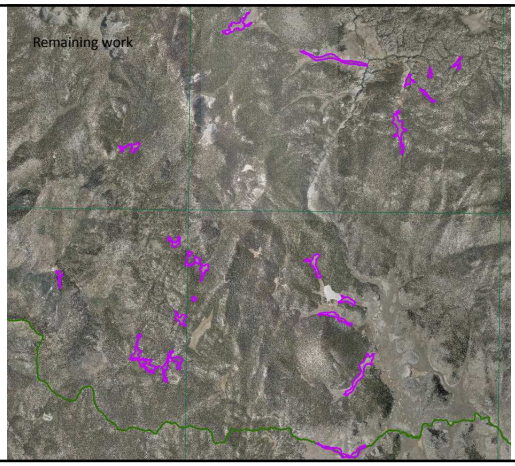

- PFC
- FAR-U
- FAR-NA
- FAR-D


Big Whitney 4h – FAR-NA
• Hummocks, rills
• Non-peat forming vegetation on hummocks, but peat forming elsewhere in fen


Big Whitney 7 – FAR-D
• Dry peat in portion of fen
• Active rill/gully network
• Rills/gullies forming around hummocks


Big Whitney 7 – dry peat

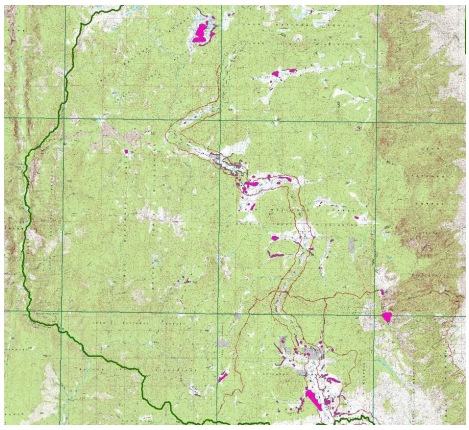
Meadow	Fen I.D.	PFC rating	Reason for FAR Rating
Horseshoe	Horseshoe_1c	PFC	
Big Whitney	Big Whitney_4h	FAR-NA	Hummocks, headcuts, rills, channelization
	Big Whitney_13	PFC	-
	Big Whitney_7	FAR-D	Hummocks, bare peat, rills, gullies
	Big Whitney_12	FAR-NA	Hummocks, bare peat
Templeton	Templeton_4	FAR-U	Hummocks, non-peating-forming vegetation
	Templeton_4a	FAR-U	Hummocks, bare peat
	Templeton_c	PFC	-
Ramshaw	Lewis_string (in Kern Pk stringer)	PFC	-
	Ramshaw_2	FAR-U	Hummocks, bare peat
	Ramshaw_2a	FAR-U	Hummocks
	Ramshaw_5	FAR-U	Hummocks
	Ramshaw_NE1	PFC	-
	Ramshaw_3	PFC	-
	Ramshaw_NE2	PFC	-
Mulkey	Mulkey_7	FAR-NA	Hummocks adjacent to fen, non-peat-forming vegetation
	Mulkey_6	FAR-U	Hummocks, bare peat
	Mulkey_10	FAR-NA	Hummocks, bare peat
	Mulkey_KitchenTable	FAR-NA	Hummocks, bare peat

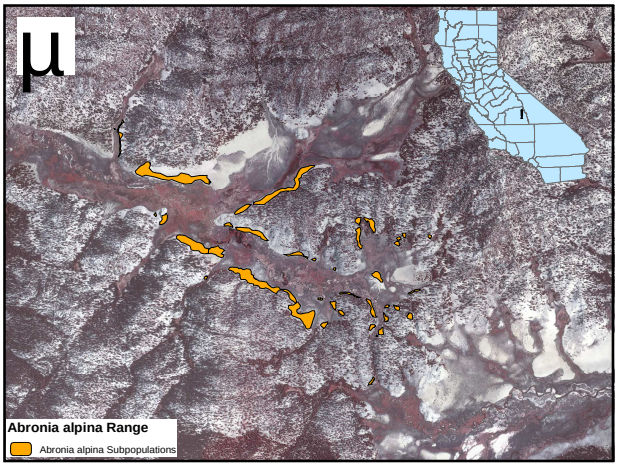


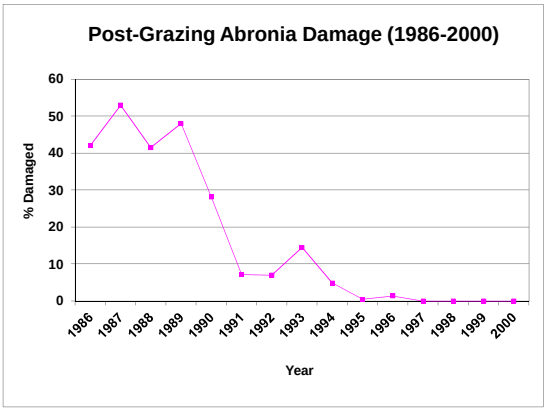
Rare Plants on the Kern Plateau
Inyo National Forest

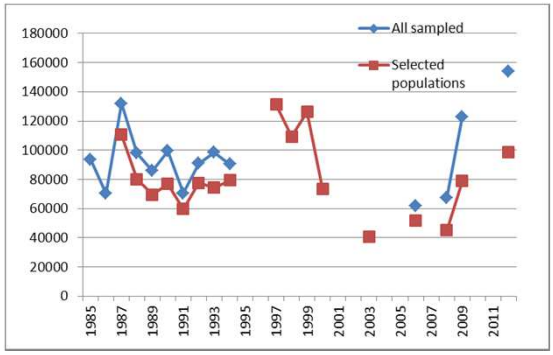
25 species:
- 16 sensitive species
- 9 watch list species

Monitoring data limited to:
- Ramshaw abronia (*Abronia alpina*)
- Kern Plateau milkvetch (*Astragalus lentiginosus* var. *kernensis*)
- Grey-leaved violet (*Viola pinetorum* ssp. *grisea*









Conservation Strategy Action Items

- ❑ Trailing strategy/trampling standard
- ❑ Midsummer monitoring/population monitoring
- ❑ Damage sampling

- ❖ Lodgepole pine
- ❖ Climate change models – implications for ABAL

- ✓ Trails – monitor, adjust
- ✓ Protective measures/fencing
- ✓ Loose herding prohibition
- ✓ Campsite removal
- ✓ Maintain "no camping" area in Templeton
- ✓ Interpretive brochure
- ✓ Genetics
- ✓ Pollination

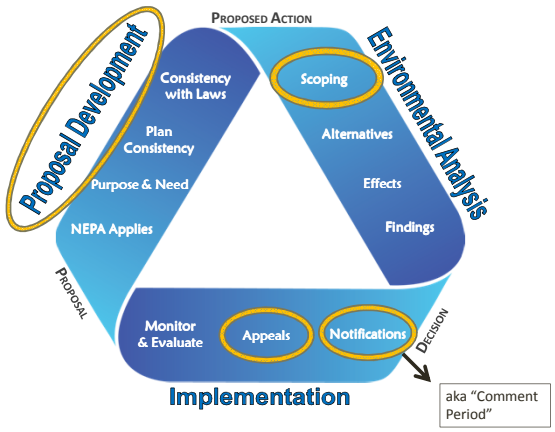
National Environmental Policy Act

Lesley Yen
Natural Resource Specialist, USFS

Why do we do NEPA?

Enacted in 1970 to **integrate environmental analysis and public involvement** in federal decision making.

Requires agencies to **consider environmental effects and alternatives**, use interdisciplinary approach



NEPA and the Kern

Environmental

Impact

Statement

NEPA and the Kern

Notice **o**f **I**ntent
Collect and Interpret Data
Alternative Development
Draft EIS
Final EIS- September 2015
Record **O**f **D**ecision **(ROD)**